

I claim:

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1. A method for cleaning a dirty surface, wherein water is squirted against the dirty surface in order to wash away the dirt with the water, wherein the water and compressed air are mixed, after which the water is squirted against the dirty surface in a spray of droplets, wherein use is made of a nozzle device having coaxial bores, the upstream wider portion of which serving as a mixing chamber wherein the water and the compressed air are mixed and wherein the mixture obtained has an overpressure relative to the environment, and the downstream narrower portion of which acting as a fluid port.
 2. A method according to claim 1, wherein the fluid port is a nozzle, wherein the spray of droplets is squirted against the dirty surface downstream of the nozzle.
 3. A method according to claim 1, wherein the fluid port leads to a second chamber having a nozzle, wherein the spray of droplets is squirted against the dirty surface downstream of the nozzle.
 4. A method according to claim 1, wherein the air pressure is at least 1 bar, preferably at least 1.5 bar.

5. A method according to claim 1, wherein the air pressure can be regulated, in particular steplessly so.

6. A method according to claim 1, wherein pressurized water is supplied to the mixing chamber at a predetermined pressure, downstream of the nozzle device.

7. A method according to claim 6, wherein the water pressure can be regulated, preferably steplessly so.

8. A method according to claim 7, wherein the water pressure can be regulated independently of the air pressure.

9. A method according to claim 1, wherein the air pressure and the water pressure are set to a ratio ranging between 2 : 1 and 1 : 2.

10. A method according to claim 1, wherein the water is squirted against the surface in a spray of droplets, from a distance which is smaller than the distance at which the water becomes turbulent downstream of the nozzle.

11. A method for cleaning according to claim 1 wherein the surface to be cleaned is on flower bulbs, flower tubers or perennial plants and wherein the water pressure and the air pressure are set as follows:

water pressure (bar)

air pressure (bar, as an overpressure relative to the water pressure)

from 0.5 to 1.5

from 8 to 8.5

5

from 1.5 to 3

from 7.5 to 8

from 2.8 to 4.2

from 5.5 to 6

from 4 to 6.2

from 5 to 5.5

from 6 to 10

from 3.5 to 4 or from 4 to 4.5 or from 4.5 to 5 or from 5 to 5.5 or from 5.5 to 6 or from 6 to 6.5

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12. A method for cleaning according to claim 1 wherein the surface to be cleaned is on soft fruit, in particular strawberries, grapes, plums, red currants, blueberries or peaches, and wherein the water pressure and the air pressure are set as follows:

water pressure (bar)

air pressure (bar, as an overpressure relative to the water pressure)

0 to 0.5

1.5 to 2 or from 2 to 2.5

0.5 to 1.5

1.5 to 2 or from 2 to 2.5

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13. A method for cleaning according to claim 1 wherein the surface to be cleaned is on medium hard crops, in particular leek, asparagus, beans, stone leeks, paprikas, gherkins, cucumbers, cabbage varieties (cauliflower, white cabbage, green cabbage, red cabbage, etc.) or tomatoes, and wherein the water pressure and the air pressure are set as follows:

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water pressure (bar)

from 2.8 to 4.2

from 4 to 6.2

from 6 to 10

air pressure (bar, as an overpressure relative to the water pressure)

from 6.5 to 7 or from 7 to 7.5 or from 7.5 to 8 or from 8 to 8.5 or from 8.5 to 9 or from 9 to 9.5

from 6.5 to 7 or from 7 to 7.5 or from 7.5 to 8 or from 8 to 8.5 or from 8.5 to 9 or from 9 to 9.5

from 6.5 to 7 or from 7 to 7.5 or from 7.5 to 8 or from 8 to 8.5 or from 8.5 to 9 or from 9 to 9.5

14. A method for cleaning according to claim 1 wherein the surface to be cleaned is on hard crops, in particular carrots, scorzoneras and rootstocks and/or fruit trees, stem crops and/or root crops for multiplication purposes, products stemming from the cultivation of onions and/or silver-skin onions or carrots and wherein the water pressure and the air pressure are set as follows:

water pressure (bar)

from 2.8 to 4.2

from 4 to 6.2

air pressure (bar, as an overpressure relative to the water pressure)

from 9.5 to 10 or from 10 to 15 or from 15 to 20

from 9.5 to 10 or from 10 to 15 or from 15 to 20

from 6 to 10

from 9.5 to 10 or from 10
to 15 or from 15 to 20

- 5 15. A method for cleaning according to claim 1 wherein
the surface to be cleaned is on sugar beets,
beetroots or potatoes, or the products stemming
therefrom, in particular chips, pulp and cattle
fodder products and wherein the water pressure and
the air pressure are set as follows:

water pressure (bar)

air pressure (bar, as an
overpressure relative to
the water pressure)

from 6 to 10

from 4 to 4.5 or from 4.5
to 5 or from 5 to 5.5 or
from 5.5 to 6 or from 6 to
6.5 or from 6.5 to 7 or
from 7 to 7.5 or from 7.5
to 8 or from 8 to 8.5 or
from 8.5 to 9 or from 9 to
9.5 or from 9.5 to 10 or
from 10 to 15 or from 15 to
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- 25 16. A method for cleaning according to claim 1 wherein
the surface to be cleaned is on roads, in
particular porous asphalt, and wherein the water
pressure and the air pressure are set as follows:

water pressure (bar)

air pressure (bar, as an
overpressure relative to
the water pressure)

from 6 to 10

from 7 to 7.5 or from 7.5
to 8 or from 8 to 8.5 or
from 8.5 to 9 or from 9 to
9.5 or from 9.5 to 10 or
from 10 to 15 or from 15 to
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17. A method for cleaning according to claim 1 wherein
the surface to be cleaned is on vehicles, in
particular passenger cars in a car wash, trains,
buses or lorries in special washing facilities,
and wherein the water pressure and the air
pressure are set as follows :

water pressure (bar)

air pressure (bar, as an
overpressure relative to
the water pressure)

from 0.5 to 1.5

from 2.5 to 3 or from 3 to
3.5 or from 3.5 to 4 or
from 4 to 4.5 or from 4.5
to 5 or from 5 to 5.5 or
from 5.5 to 6.

18. A method for cleaning according to claim 1 wherein
the surface to be cleaned is on crockery, cutlery
and the like in a dishwasher, and machines or
tools in an industrial washing-up machine, and
wherein the water pressure and the air pressure
are set as follows:

water pressure (bar)

from 0.5 to 1.5

air pressure (bar, as an overpressure relative to the water pressure)

from 4.5 to 5 or from 5 to 5.5 or from 5.5 to 6 or from 6 to 6.5 or from 6.5 to 7 or from 7 to 7.5 or from 7.5 to 8.

19. A method for cleaning according to claim 1 wherein the surface to be cleaned is on persons, using a shower head, and wherein the water pressure and the air pressure are set as follows:

water pressure (bar)

from 0.5 to 1.5

from 1.5 to 3

air pressure (bar, as an overpressure relative to the water pressure)

from 1.5 to 2 or from 2 to 2.5 or from 2.5 to 3 or from 3 to 3.5 or from 3.5 to 4 or from 4 to 4.5 or from 4.5 to 5

from 1.5 to 2 or from 2 to 2.5 or from 2.5 to 3 or from 3 to 3.5 or from 3.5 to 4 or from 4 to 4.5 or from 4.5 to 5.

20. A method for cleaning according to claim 1 wherein the surface to be cleaned is on hard surfaces, in particular facades of houses, industrial and commercial buildings, glass, plastics and metal

and wherein the water pressure and the air pressure are set as follows:

water pressure (bar)	air pressure (bar, as an overpressure relative to the water pressure)
from 6 to 10	from 9.5 to 10 or from 10 to 15 or from 15 to 20.

21. A method for cleaning according to claim 1 wherein the surface to be cleaned is on soft surfaces, in particular wool or fibrous materials, such as cotton, flax, textile, silk or paper and wherein the water pressure and the air pressure are set as follows:

water pressure (bar)	air pressure (bar, as an overpressure relative to the water pressure)
from 2.8 to 4.2	from 6.5 to 7 or from 7 to 7.5 or from 7.5 to 8 or from 8 to 8.5 or from 8.5 to 9 or from 9 to 9.5
from 4 to 6.2	from 6.5 to 7 or from 7 to 7.5 or from 7.5 to 8 or from 8 to 8.5 or from 8.5 to 9 or from 9 to 9.5
from 6 to 10	from 6.5 to 7 or from 7 to 7.5 or from 7.5 to 8 or from 8 to 8.5 or from 8.5 to 9 or from 9 to 9.5

22. A device for cleaning a dirty surface comprising
a nozzle device having coaxial bores, the
upstream wider portion of which serving as a
mixing chamber and the downstream narrower
5 portion of which acting as fluid port being a
nozzle or leading to a second chamber having a
nozzle and

means for supplying waters, which may or
may not be pressurized, and compressed air at
10 a predetermined pressure to the mixing
chamber.

23. A device according to claim 22, wherein the nozzle
is present in a wall of the mixing chamber.

24. A device according to claim 22, wherein the mixing
15 chamber preferably converges in the direction of
the nozzle.

25. A device according to claim 22, wherein means are
provided for regulating the air pressure,
preferably steplessly so, as well as means for
20 regulating the water pressure, preferably
steplessly so, in particular of the air pressure.

26. A device according to claim 22, wherein the nozzle
is movable, and wherein the nozzle is preferably
mounted on a rotatable arm.

27. A device according to claim 22, wherein the second
chamber comprises a member which is capable of
rotation under the influence of the water for

rotatably squirting the water in a spray of droplets downstream of the nozzle.

28. A device according to claim 22, wherein the device is accommodated in a housing.

5 29. A device for cleaning according to claim 22 wherein the surface to be cleaned is on flower bulbs, flower tubers or perennial plants and wherein the water pressure and air pressure are set as follows:

10	water pressure (bar)	air pressure (bar, as an overpressure relative to the water pressure)
	from 0.5 to 1.5	from 8 to 8.5
	from 1.5 to 3	from 7.5 to 8
15	from 2.8 to 4.2	from 5.5 to 6
	from 4 to 6.2	from 5 to 5.5
	from 6 to 10	from 3.5 to 4 or from 4 to 4.5 or from 4.5 to 5 or from 5 to 5.5 or from 5.5 to 6 or from 6 to 6.5
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30. A device for cleaning according to claim 22 wherein the surface to be cleaned is on soft fruit, in particular strawberries, grapes, plums, red currants, blueberries or peaches, and wherein
25 the water pressure and air pressure are set as follows:

water pressure (bar)

air pressure (bar, as an
overpressure relative to
the water pressure)

0 to 0.5

1.5 to 2 or from 2 to 2.5

5

0.5 to 1.5

1.5 to 2 or from 2 to 2.5

31. A device for cleaning according to claim 22
wherein the surface to be cleaned is on medium
hard crops, in particular leek, asparagus, beans,
stone leeks, paprikas, gherkins, cucumbers,
cabbage varieties (cauliflower, white cabbage,
green cabbage, red cabbage, etc.) or tomatoes, and
wherein the water pressure and air pressure are
set as follows:

water pressure (bar)

air pressure (bar, as an
overpressure relative to
the water pressure)

15

from 2.8 to 4.2

from 6.5 to 7 or from 7 to
7.5 or from 7.5 to 8 or
from 8 to 8.5 or from 8.5
to 9 or from 9 to 9.5

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from 4 to 6.2

from 6.5 to 7 or from 7 to
7.5 or from 7.5 to 8 or
from 8 to 8.5 or from 8.5
to 9 or from 9 to 9.5

25

from 6 to 10

from 6.5 to 7 or from 7 to
7.5 or from 7.5 to 8 or
from 8 to 8.5 or from 8.5
to 9 or from 9 to 9.5

32. A device for cleaning according to claim 22
wherein the surface to be cleaned is on hard

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crops, in particular carrots, scorzoneras and
rootstocks and/or fruit trees, stem crops and/or
root crops for multiplication purposes, products
stemming from the cultivation of onions and/or
silver-skin onions or carrots, and wherein the
water pressure and air pressure are set as
follows:

water pressure (bar)	air pressure (bar, as an overpressure relative to the water pressure)
from 2.8 to 4.2	from 9.5 to 10 or from 10 to 15 or from 15 to 20
from 4 to 6.2	from 9.5 to 10 or from 10 to 15 or from 15 to 20
from 6 to 10	from 9.5 to 10 or from 10 to 15 or from 15 to 20

33. A device for cleaning according to claim 22
wherein the surface to be cleaned is on sugar
beets, beetroots or potatoes, or the products
stemming therefrom, in particular chips, pulp and
cattle fodder products, and wherein the water
pressure and air pressure are set as follows:

water pressure (bar)	air pressure (bar, as an overpressure relative to the water pressure)
from 6 to 10	from 4 to 4.5 or from 4.5 to 5 or from 5 to 5.5 or from 5.5 to 6 or from 6 to

6.5 or from 6.5 to 7 or
from 7 to 7.5 or from 7.5
to 8 or from 8 to 8.5 or
from 8.5 to 9 or from 9 to
9.5 or from 9.5 to 10 or
from 10 to 15 or from 15 to
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34. A device for cleaning according to claim 22
wherein the surface to be cleaned is on roads, in
particular porous asphalt, and wherein the water
pressure and air pressure are set as follows:

water pressure (bar)	air pressure (bar, as an overpressure relative to the water pressure)
from 6 to 10	from 7 to 7.5 or from 7.5 to 8 or from 8 to 8.5 or from 8.5 to 9 or from 9 to 9.5 or from 9.5 to 10 or from 10 to 15 or from 15 to 20

35. A device for cleaning according to claim 22
wherein the surface to be cleaned is on vehicles,
in particular passenger cars in a car wash,
trains, buses or lorries in special washing
facilities, and wherein the water pressure and air
pressure are set as follows:

water pressure (bar)	air pressure (bar, as an overpressure relative to the water pressure)
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from 0.5 to 1.5

from 2.5 to 3 or from 3 to
3.5 or from 3.5 to 4 or
from 4 to 4.5 or from 4.5
to 5 or from 5 to 5.5 or
from 5.5 to 6.

5

36. A device for cleaning according to claim 22
wherein the surface to be cleaned is on crockery,
cutlery and the like in a dishwasher, and machines
or tools in an industrial washing-up machine, and
wherein the water pressure and air pressure are
set as follows:

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water pressure (bar)

air pressure (bar, as an
overpressure relative to
the water pressure)

15

from 0.5 to 1.5

from 4.5 to 5 or from 5 to
5.5 or from 5.5 to 6 or
from 6 to 6.5 or from 6.5
to 7 or from 7 to 7.5 or
from 7.5 to 8.

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37. A device for cleaning according to claim 22
wherein the surface to be cleaned is on persons,
using a shower head, and wherein the water
pressure and air pressure are set as follows:

water pressure (bar)

air pressure (bar, as an
overpressure relative to
the water pressure)

25

from 0.5 to 1.5

from 1.5 to 2 or from 2 to
2.5 or from 2.5 to 3 or
from 3 to 3.5 or from 3.5
to 4 or from 4 to 4.5 or
from 4.5 to 5

from 1.5 to 3

from 1.5 to 2 or from 2 to
2.5 or from 2.5 to 3 or
from 3 to 3.5 or from 3.5
to 4 or from 4 to 4.5 or
from 4.5 to 5.

38. A device for cleaning according to claim 22
wherein the surface to be cleaned is on hard
surfaces, in particular facades of houses,
industrial and commercial buildings, glass,
plastics and metal, and wherein the water pressure
and air pressure are set as follows:

water pressure (bar)

air pressure (bar, as an
overpressure relative to
the water pressure)

from 6 to 10

from 9.5 to 10 or from 10
to 15 or from 15 to 20.

39. A device for cleaning according to claim 22
wherein the surface to be cleaned is on soft
surfaces, in particular wool or fibrous materials,
such as cotton, flax, textile, silk or paper, and
wherein the water pressure and air pressure are
set as follows:

water pressure (bar)

from 2.8 to 4.2

from 4 to 6.2

from 6 to 10

air pressure (bar, as an
overpressure relative to
the water pressure)

from 6.5 to 7 or from 7 to
7.5 or from 7.5 to 8 or
from 8 to 8.5 or from 8.5
to 9 or from 9 to 9.5

from 6.5 to 7 or from 7 to
7.5 or from 7.5 to 8 or
from 8 to 8.5 or from 8.5
to 9 or from 9 to 9.5

from 6.5 to 7 or from 7 to
7.5 or from 7.5 to 8 or
from 8 to 8.5 or from 8.5
to 9 or from 9 to 9.5

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